

Patent claims

1. An apparatus for fitting substrates (13) with electrical components (3) by means of a moveable fitting head (1, 17) for handling the components (3), which can be picked up at feed devices by at least one gripper (4, 14) belonging to the fitting head (1, 17), transported to fitting locations on the substrate (13) and placed onto the substrate (13) there, characterized in that the fitting head (1, 17) has at least one storage element (7), separate from the gripper (4, 14) having a plurality of storage spaces (11) for the components (3), in that the gripper (4, 14) and the storage spaces (11) can be moved relative to one another, in that the components (3) picked up by the gripper (4, 14) can be deposited at the storage spaces (11) of the storage element (7), and in that the deposited components (3) can be removed from the storage spaces (11) by means of the gripper (4, 14) and placed onto the substrate (13).
2. The apparatus as claimed in claim 1, characterized in that the components (3) can be fixed at a holding end of the gripper (4, 14), in that the holding end can be moved transversely with respect to the placement direction of the components (3) into a transfer position, which is assigned to a transfer station of the fitting head (1, 17), and in that the storage spaces (11) in the fitting head (1, 17) can be displaced successively to the transfer station.
3. The apparatus as claimed in claim 2, characterized in that the gripper (4, 14) is mounted on a pivoting part (5) of the fitting head (1, 17) and

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in that the holding end can be pivoted transversely with respect to the placement direction, by means of the pivoting part, between a placement station and the transfer station.

5 4. The apparatus as claimed in claim 3, characterized in that the gripper (4, 14) is mounted in a guide in the pivoting part (5), such that it can be displaced longitudinally in the placement direction.

10 5. The apparatus as claimed in claim 4, characterized in that the holding end in the transfer station (19) can be displaced longitudinally in the direction of the storage space (11) located there.

15 6. The apparatus as claimed in one of claims 1 to 5, characterized in that the gripper (4, 14) is constructed as a suction gripper and in that the pressure conditions in the gripper (4, 14) in the transfer position can be controlled in such a way that the holding force of the gripper (4, 14) falls above or below the holding force of the storage space (11).

20 7. The apparatus as claimed in one of claims 2 to 6, characterized in that the storage spaces (11) are distributed in a grid-like fashion on a sliding part (8), which is mounted on the fitting head (1, 17) such that it can be displaced step by step, and in that the
25 storage spaces (11) can be displaced successively to the transfer station.

8. The apparatus as claimed in claim 7, characterized in that the sliding part (8) on the storage spaces (11) is provided with suction openings
30 (10) for the components (3).

9. The apparatus as claimed in claim 8,

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characterized in that the suction openings (10) of the storage element (7) are permanently connected to a common suction line.

10. The apparatus as claimed in claim 9,
5 characterized in that the storage element (7) on the transfer station is provided with means for changing over the pressure in the suction opening (10).

11. The apparatus as claimed in one of claims 7 to 10, characterized in that the sliding part (8) is of
10 annular design and rotatably mounted.

12. The apparatus as claimed in claim 11, characterized in that the axis of rotation of the sliding part (8) is congruent with the longitudinal axis of the gripper (4, 14) located in the placement
15 position, and in that the storage spaces (11) for the components (3) have supporting surfaces which extend perpendicular to the longitudinal axis of the gripper (4, 14) located in the transfer position.

13. The apparatus as claimed in one of the
20 preceding claims, characterized in that the pivoting part (5) is provided with a plurality of guides for a plurality of the grippers (4, 14), which can be pivoted successively into the transfer position.

14. The apparatus as claimed in claim 13,
25 characterized in that in the pivoting part (5), two grippers (4) are provided which have longitudinal axes in a V shape with respect to each other in a pivoting plane, and

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in that the grippers (4) can be pivoted alternately into the placement position, in which the respective other gripper (4) is located in the transfer position.

15. The apparatus as claimed in claim 13,
5 characterized in that the pivoting part is constructed as a turret-like rotor (15) having a multiplicity of circularly arranged grippers (14), and in that the rotor (15) can be driven and indexed in accordance with the angular pitch of the grippers (14).

10 16. The apparatus as claimed in claim 15, characterized in that working stations are provided along a circulation path of the grippers (14), on a stator (16) of the fitting head (17), and in that at least one of the working stations forms the transfer
15 station (19).

17. The apparatus as claimed in claim 16, characterized in that in the direction of rotation of the rotor (15), between the transfer station (19) and the placement station (18), there are arranged a
20 sensing station (20) for determining the position of the components (3) and a rotation station (21) for the components (3).

18. The apparatus as claimed in one of the preceding claims, characterized in that the fitting
25 head (17) has at least one further storage element (7), which is assigned at least one further transfer station.

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